



CRBOM Small Publications Series No. 31

**Drama and dilemmas
on the banks of the
Cikapundung River**

by

Supardiyono Sobirin

**Center for River Basin Organizations and Management,
Solo, Central Java, Indonesia**

January 2011

The '*Small Publications*' are intended for knowledge-sharing and dialogue. In some cases they may present facts, information and lessons learnt. In other cases, they provide news, opinions, ideas or open questions for discussion.

They express the opinions of the author(s) and not those of CRBOM.

They can be freely copied and disseminated.

Contributions are most welcome - in English or in Bahasa Indonesia.

The author:

Supardiyono Sobirin

Member, Observer Board on Forestry and Environment of West Java

Retired Head of Research Center for Human Settlements, and Research Center for Water Resources, both under Agency for Research and Development, Ministry of Public Works; now active as a social worker at various NGOs

sobirinsobirin@gmail.com, facebook: www.facebook.com/supardiyono.sobirin

blogs: www.sobirin-xyz.blogspot.com, www.clearwaste.blogspot.com

CRBOM

Center for River Basin Organizations and Management,
Solo, Central Java, Indonesia

www.crbom.org

info@crbom.org

Contents

Acknowledgement.....	i
Glossary.....	ii
Summary.....	ii
1 Introduction.....	1
2 Study objective.....	1
3 Background.....	1
4 Drama and dilemma analysis.....	3
4.1 Drama theory.....	3
4.2 The process.....	3
4.3 The parties and their positions.....	5
5 Dilemmas.....	7
5.1 Government's dilemmas.....	7
5.2 Business' dilemmas.....	8
5.3 Community's dilemmas.....	9
6 Observations and conclusion.....	10
6.1 Methodology.....	10
6.2 Scope for compromise and conciliation.....	10
6.3 Bottom line.....	10
References and literature.....	11
Appendix A: The Cikapundung River Basin.....	12

Acknowledgement

The author extends his deepest gratitude to Dr. Utomo Sarjono Putro and others from School of Business and Management, Institute of Technology Bandung (SBM-ITB), for having willingly shared their knowledge on drama theory and for the opportunity to use the computer program '*Confrontation Manager*'.

Glossary

Amenity (in this paper): A pleasant state of the river and the area around it

Compromise (in this paper): An agreement based on mutual modification of initial positions

Conciliation (in this paper): To build good relations as a basis for an agreement that does not require significant changes of initial positions (by sorting out misunderstandings and providing additional information)

Dilemma: A difficult choice

Episode (in this paper): A cycle in the drama process. If an agreement is reached, the episode will lead to a decision. If no agreement is made, a new episode is required

Option (in this paper): An action that is available and can be chosen for implementation

Position (in this paper): An offer declared by one stakeholder to act in a certain way, provided that all other stakeholders act in certain ways

Threat (in this paper): An intent declared by one stakeholder to act in a certain way if one or several other stakeholders act in a way that is regarded as undesirable or unacceptable

Summary

The small Cikapundung River intersects the city of Bandung, West Java from north to south. Its banks are densely settled, and its water quality is poor. The need to upgrade the river and its surroundings is broadly acknowledged, and several initiatives are in preparation.

Developing the Cikapundung Basin into a clean, pleasant and sustainable amenity is not only achieved by physical infrastructure but should also consider non-physical and negotiable aspects. An integrated and bottom-up approach will certainly add value as a supplement to the traditional top-down concept.

This paper considers the preferences and concerns of development agents and the local community. The compatibilities between them are examined by a drama and dilemma analysis, providing information about the interaction that is required for compromise or conciliation.

It is believed that a clean and pleasant Cikapundung River can be strongly supported by agreement among the involved parties on a sustainable and beneficial development.

1 Introduction

This paper exemplifies the use of drama theory for a case of river restoration and river bank development.

The paper is an extract of a more comprehensive paper that was presented in November 2010 in Solo at the National Seminar and Workshop of River Management in Indonesia, organized by CRBOM and Sungai Balai, Research Center for Water Resources, under Ministry of Public Works.

2 Study objective

Many cases of infrastructural development show a lack of success caused by non-physical constraints. Overlooking preferences and concerns of affected communities may result in protests and even failure.

The present study is therefore oriented towards the preferences and concerns of development agents and the local community, the compatibilities between them, and the interaction that is required to arrive at an agreed decision.

Hereby, it is believed that a clean and pleasant Cikapundung River can be achieved successfully when the involved parties agree on the compromises that are required for a sustainable and beneficial development.

3 Background

Cikapundung River

The 28 km long Cikapundung River in West Java intersects the city of Bandung from north to south, before discharging into Citarum River just south of Bandung. Its banks are densely settled, and its water quality is poor.

Please refer to Appendix A for additional information.

Planned development

The need to upgrade the river and its surroundings is broadly acknowledged and is intensely covered by the media. Several initiatives are in preparation:

- 1) In the framework of establishing a sustainable and environment friendly city development and making Bandung a green and harmonious city, the local government has included the Cikapundung as priority in the Bandung long-term regional development plan (2005-2025) and medium-term regional development plan (2009-2013). The Cikapundung in its very apprehensive condition will be revitalized into a clean, pleasurable and preserved river through the program Gerakan Cikapundung Bersih/ Clean Cikapundung Movement. This program is

supported by the West Java Regional Government as well as Bappenas.¹ The aim of the Bandung Government to change the Cikapundung into a city icon is expected to realize the vision of the government of making Bandung *'bermartabat'* (*bersih, makmur, taat, bersahabat*; or clean, prosperous, loyal and friendly).

- 2) Like the Indonesian proverb says *'ada gula ada semut'* (where there is sugar there will be ants), the Cikapundung revitalization plan has attracted the attention of the private sector. A property developer has been commissioned to implement the *'Kawasan Wisata Budaya Sungai Cikapundung'* (Cikapundung River Cultural Tourist Area) by an instruction from the mayor of Bandung (in 2008) and a decree of the government of West Java (2009). The rehabilitation includes the following:
 - a. Grand design of the area in line with the development of Bandung as a metropolitan city.
 - b. Concession to use land on floodplains of the Cikapundung in accordance with the law.
 - c. Marketing of land to investors in line with city and West Java provincial regulations.
 - d. Establishing partnerships with other parties in controlling the grand design implementation.
 - e. Commercial development cannot be avoided, but is not the main objective, and the local community is still the prime concern. One commercial element is a planned shopping center near the river, covering 17 ha, of which 5 to 6 ha will be used for public facilities and green open space.
- 3) On the other hand, approximately 72,000 squatters live in 1,058 shacks on the Cikapundung floodplains. They will be affected immediately by the planned development. In general, they support the Cikapundung program; but when faced with the possibility of relocation, they hesitate to leave their neighbourhood. They enjoy living close to waterways, and prevention of social conflicts requires land acquisition and huge amounts of time and money.

Stakeholders

Many parties are involved in this development: The city administration, the city council, the private sector, environmentalists, universities, local government administrators in the upstream Cikapundung, the provincial government, the central government, and others.

The following analysis, however, is confined to three key stakeholders: The city administration, the private sector, and the people living on the floodplains. All of these support the intention of a clean, pleasant and preserved Cikapundung River; but each of them has some individual interests, and disagreements exist between them.

¹ Bappenas is the national planning agency

Table 1: Essence of stakeholder concerns and preferences

The city administration	The city administration intends to develop river amenities not only as public open green space, but also as a source of income. The administrators are forced to be ambiguous. On the one hand, they have to involve the private sector because of limited funds; whereas on the other hand they want the people to continue living on the floodplains since relocating them to other areas would not be easy.
The private sector	The private sector like to invest but expect to earn a profit. The private sector would build a river amenity with a commercial concept and favours a relocation of the people living on the floodplains.
The local residents	Squatters who live in the area worry about their future and income, and fear a relocation. They oppose a commercialized development.

4 Drama and dilemma analysis

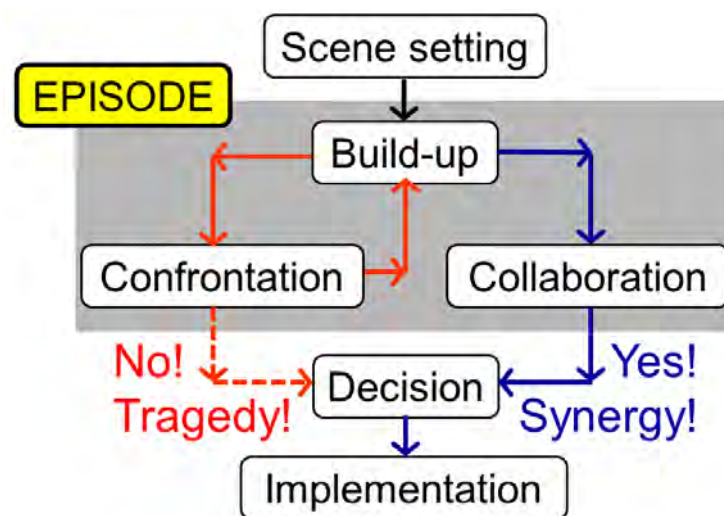
The following analysis has kindly been guided by dr. Utomo Sarjono Putro and others from School of Business and Management, Institute of Technology Bandung (SBM-ITB), using “*Confrontation Manager*” software owned by SBM-ITB.

4.1 Drama theory

Drama theory was devised by N. Howard and J. Bryant in 1993 (Jun Oura, Aug 07). It can be used for examination and resolution of complex situations between stakeholders, considering rational as well as emotional aspects.

4.2 The process

Figure 1: The drama process



Source: Modified after Jun Oura (Aug 07)

The following stages are considered:

Setting the scene

Stakeholders in the process are identified.

Build-up

The stakeholders express their positions and threats.

Collaboration

Each stakeholder considers the harmony among the various positions. If these are compatible, a collaboration can be initiated and an agreed decision can be made on implementation.

Confrontation

A disagreement between the stakeholders can trigger a dilemma. A confrontation analysis can resolve the problem. This can be done as follows:

- a. First attempt: Consolidation or compromise. Each stakeholder must modify their positions and threats until harmony is reached, although each may feel that expectations and concerns are not fully reflected.
- b. Second attempt: Emotional pressure or rejection. Stakeholders insist that one option is better than some threat.
- c. Each stakeholder prepares a strategy and tactics to resolve the dilemma among them, and makes sure that the position is understood by the others.
- d. Confrontations are analyzed, considering six types of dilemmas:

Collaboration dilemmas (when the stakeholders agree)

- 1 X's trust dilemma: X doesn't believe Y would carry out its actual promise to implement X's position
- 2 X's cooperation dilemma: Y doesn't believe X would carry out its actual promise to implement Y's position

Confrontation dilemmas (when disagreements exist between the stakeholders):

- 3 X's threat dilemma: Y doesn't believe X would carry out its threat not to implement Y's position
- 4 X's rejection dilemma: X may prefer Y's position to the otherwise threatened future
- 5 X's positioning dilemma: X prefers Y's position to its own, but rejects it (usually because it considers it unrealistic)
- 6 X's persuasion dilemma: Y certainly prefers the threatened future to X's position

Decision

When confrontation has ended, each stakeholder decides their new option according to achieved negotiation results. Some may change their positions and/or threats. They may re-negotiate if needed. This can initiate a new cycle in the process.

Implementation

Once all agents agree to collaborate, each of them must implement the negotiated results (which cannot be changed).

4.3 The parties and their positions

The parties and their options

Three parties are considered, illustrating the key stakeholders in the process. They are listed below, together with their options:

GOVERNMENT	can develop river amenity
BUSINESS	can develop commercial amenity-related business
COMMUNITY	can avoid resettlement

Positions and threats

The table below lists the positions of the parties and some related threats.

Table 2: Parties, positions and threats

Party	Positions	Related threats
GOVERNMENT (G)	(G) should develop river amenity (B) should develop commercial amenity-related business (C) should not resettle	(G) will not develop river amenity
BUSINESS (B)	a. (G) should develop river amenity b. (B) should develop commercial amenity-related business c. (C) should resettle	(B) will develop commercial amenity-related business
COMMUNITY (C)	(G) should develop river amenity (B) should not develop commercial amenity-related business (C) should not resettle	(C) will not resettle

Compatibilities

Table 2 shows that

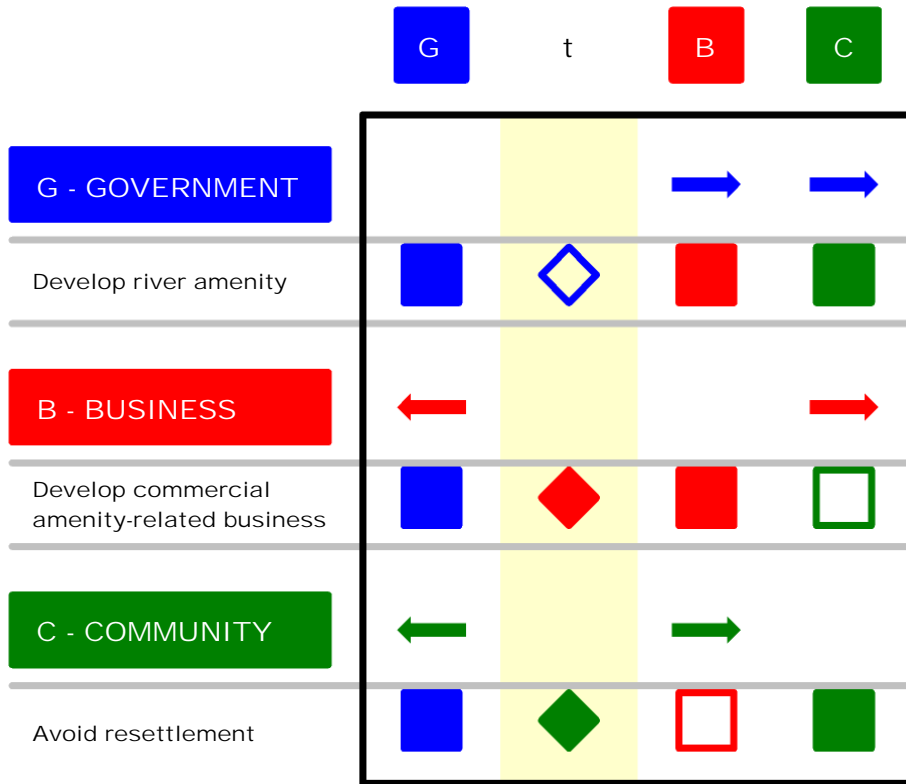
GOVERNMENT's position is incompatible with all other positions.

BUSINESS' position is incompatible with all other positions.

COMMUNITY's position is incompatible with all other positions.






The positions and their relations are illustrated in the figure below.

Figure 2: Options board



The left column lists the stakeholders and their options. (In this example, there is only one option for each stakeholder; but there could be more)

The columns inside the frame show declared positions for each stakeholder (column G, B and C), and a scenario of threats (column t)

-  A filled square indicates an option that has been adopted by a stakeholder
-  A blank square indicates an option that is rejected by a stakeholder
-  A filled diamond indicates a threat that has been adopted by a stakeholder
-  A blank diamond indicates a threat that is rejected by a stakeholder
-  An arrow pointing away from column 't' indicates that an option is preferred to the threat. An arrow pointing towards column 't' (not used in this example) indicates that the threat is preferred to an option

5 Dilemmas

This chapter describes the dilemmas of each stakeholder, and the related possible courses of action

5.1 Government's dilemmas

GOVERNMENT's rejection dilemma with respect to BUSINESS

- a (G)'s problem: Its rejection of (B)'s position is not credible; (B) believes that (G) may prefer its own position to the threatened future.
- b Possible courses of action for (G):
- b.1 First possibility: Conciliation or compromise
- There is common ground between (G) and (B). For both, (B)'s position is potentially better than the threatened future. (G)'s problem is (B)' insistence that (C) should relocate.
- Why does (B) take this position? (G) must analyze (B)'s underlying concerns, and then suggest how to modify both positions to make them compatible.
- b.2 Second possibility: Rejection
- (G) indicates to (B) that it does prefer the threatened future to (B)'s position.
- But this is not enough. To change (B)'s mind, (G) must, by adding to or changing the set of available options, do one or both of the following:
- Show that the costs to (G) of (B)'s position are greater, or more credible, than (B) supposes.
 - Show that the advantages to (G) of the threatened future are greater, or more credible, than (B) supposes.

(G)'s rejection dilemma with respect to COMMUNITY

- a (G)'s problem: Its rejection of (C)'s position is not credible; (C) believes that (G) may prefer its own position to the threatened future.
- b Possible courses of action for (G):
- b.1 First possibility: Conciliation or compromise
- There is common ground between (G) and (C). For both, (C)'s position is potentially better than the threatened future. (G)'s problem is (C)'s insistence that (B) should not develop commercial amenity-related business.
- Why does (C) take this position? (G) must analyze (C)'s underlying concerns, and then suggest how to modify both positions to make them compatible.
- b.2 Second possibility: Rejection
- (G) indicates to (C) that it does prefer the threatened future to (C)'s position.
- But this is not enough. To change (C)'s mind, (G) must, by adding to or changing the set of available options, do one or both of the following:
- Show that the costs to (G) of (C)'s position are greater, or more credible, than (C) supposes.
 - Show that the advantages to (G) of the threatened future are greater, or more credible, than (C) supposes.

5.2 Business' dilemmas

BUSINESS' rejection dilemma with respect to GOVERNMENT

- a (B)'s problem: Its rejection of (G)'s position is not credible; (G) believes that (B) may prefer its own position to the threatened future.
- b Possible courses of action for (B):
- b.1 First possibility: Conciliation or compromise
- There is common ground between (B) and (G). For both, (G)'s position is potentially better than the threatened future. (B)'s problem is (G)'s insistence that (C) should not relocate.
- Why does (G) take this position? (B) must analyze (G)'s underlying concerns, and then suggest how to modify both positions to make them compatible.
- b.2 Second possibility: Rejection
- (B) indicates to (G) that it does prefer the threatened future to (G)'s position.
- But this is not enough. To change (G)'s mind, (B) must, by adding to or changing the set of available options, do one or both of the following:
- Show that the costs to (B) of (G)'s position are greater, or more credible, than (G) supposes.
 - Show that the advantages to (B) of the threatened future are greater, or more credible, than (G) supposes.

BUSINESS' rejection dilemma with respect to COMMUNITY

- a (B)'s problem: Its rejection of (C)'s position is not credible; (C) believes that (B) may prefer its own position to the threatened future.
- b Possible courses of action for (B):
- b.1 First possibility: Conciliation or compromise
- There is common ground between (B) and (C). For both, (C)'s position is potentially better than the threatened future. (B)'s problem is (C)'s insistence that:
- (B) should not develop commercial amenity-related business.
 - (C) should not relocate.
- Why does (C) take this position? (B) must analyze (C)'s underlying concerns, and then suggest how to modify both positions to make them compatible.
- b.2 Second possibility: Rejection
- (B) indicates to (C) that it does prefer the threatened future to (C)'s position.
- But this is not enough. To change (C)'s mind, (B) must, by adding to or changing the set of available options, do one or both of the following:
- Show that the costs to (B) of (C)'s position are greater, or more credible, than (C) supposes.
 - Show that the advantages to (B) of the threatened future are greater, or more credible, than (C) supposes.

5.3 Community's dilemmas

COMMUNITY's rejection dilemma with respect to GOVERNMENT

- a (C)'s problem: Its rejection of (G)'s position is not credible; (G) believes that (C) may prefer its own position to the threatened future.
- b Possible courses of action for (C):
- b.1 First possibility: Conciliation or compromise
- There is common ground between (C) and (G). For both, (G)'s position is potentially better than the threatened future. (C)'s problem is (G)'s insistence that (B) should develop commercial amenity-related business.
- Why does (G) take this position? (C) must analyze (G)'s underlying concerns, and then suggest how to modify both positions to make them compatible.
- b.2 Second possibility: Rejection
- (C) indicates to (G) that it does prefer the threatened future to (G)'s position.
- But this is not enough. To change (G)'s mind, (C) must, by adding to or changing the set of available options, do one or both of the following:
- Show that the costs to (C) of (G)'s position are greater, or more credible, than (G) supposes.
 - Show that the advantages to (C) of the threatened future are greater, or more credible, than (G) supposes.

COMMUNITY's rejection dilemma with respect to BUSINESS

- a (C)'s problem: Its rejection of (B)'s position is not credible; (B) believes that (C) may prefer its own position to the threatened future.
- b Possible courses of action for (C):
- b.1 First possibility: Conciliation or compromise
- There is common ground between (C) and (B). For both, (B)'s position is potentially better than the threatened future. (C)'s problem is (B)'s insistence that:
- (B) should develop commercial amenity-related business.
 - (C) should relocate.
- Why does (B) take this position? (C) must analyze (B)'s underlying concerns, and then suggest how to modify both positions to make them compatible.
- b.2 Second possibility: Rejection
- (C) indicates to (B) that it does prefer the threatened future to (B)'s position.
- But this is not enough. To change (B)'s mind, (C) must, by adding to or changing the set of available options, do one or both of the following:
- Show that the costs to (C) of (B)'s position are greater, or more credible, than (B) supposes.
 - Show that the advantages to (C) of the threatened future are greater, or more credible, than (B) supposes.

6 Observations and conclusion

6.1 Methodology

Drama theory and the computer program '*Confrontation Manager*' are well suited for finding solutions related to the interaction and potential conflicts among development agents and other stakeholders.

The approach can probably serve a useful purpose both if applied stringently and if applied conceptually, as a line of thinking.

6.2 Scope for compromise and conciliation

There is a scope for compromise and conciliation between the stakeholders:

- 1) (G) has already issued regulations on a clean, prosperous, loyal and friendly (Bermartabat) Cikapundung River amenity development related among others to land consolidation.
- 2) (B) has commenced construction of river amenity physical infrastructure in compliance with the agreed design, which includes the construction of a shopping center, high housing for the squatters who have agreed to be relocated, and low-cost housing.
- 3) (C) does not have to worry of being moved because relocation is done to apartments built adjacent to the river. Moreover, (C) will receive education from (G) and (B).

The following aspects must be observed:

- 1) Design of the river amenity must comply with the character of Cikapundung River (with its potential for flash floods).
- 2) Cikapundung River can be improved by conservation in its upstream parts, in collaboration with the administration of Kabupaten Bandung Barat.
- 3) A reasonable (and fairly clear) regulation is in place of land use (including buildings) in the close vicinity of river banks, but it is not always observed.

6.3 Bottom line

Developing the Cikapundung Basin into a clean, pleasant and sustainable amenity is not only achieved by physical infrastructure but should also consider non-physical and negotiable aspects. An integrated and bottom-up approach will certainly add value as a supplement to the traditional top-down concept.

Successful implementation of a river amenity can be assisted by broad support from all parties involved. This can build on principles as follows:

- 1) The position of one party shall prompt reactions from other parties, such as approval or rejection.
- 2) In case of rejection, a party may ask another party for reconciliation or compromise by modifying the position offered, so that an agreement is reached.
- 3) If reconciliation or compromise cannot be achieved, a party may have to enforce its position, but should, at the same time, keep in mind the benefits of a mutually acceptable and beneficial solution.

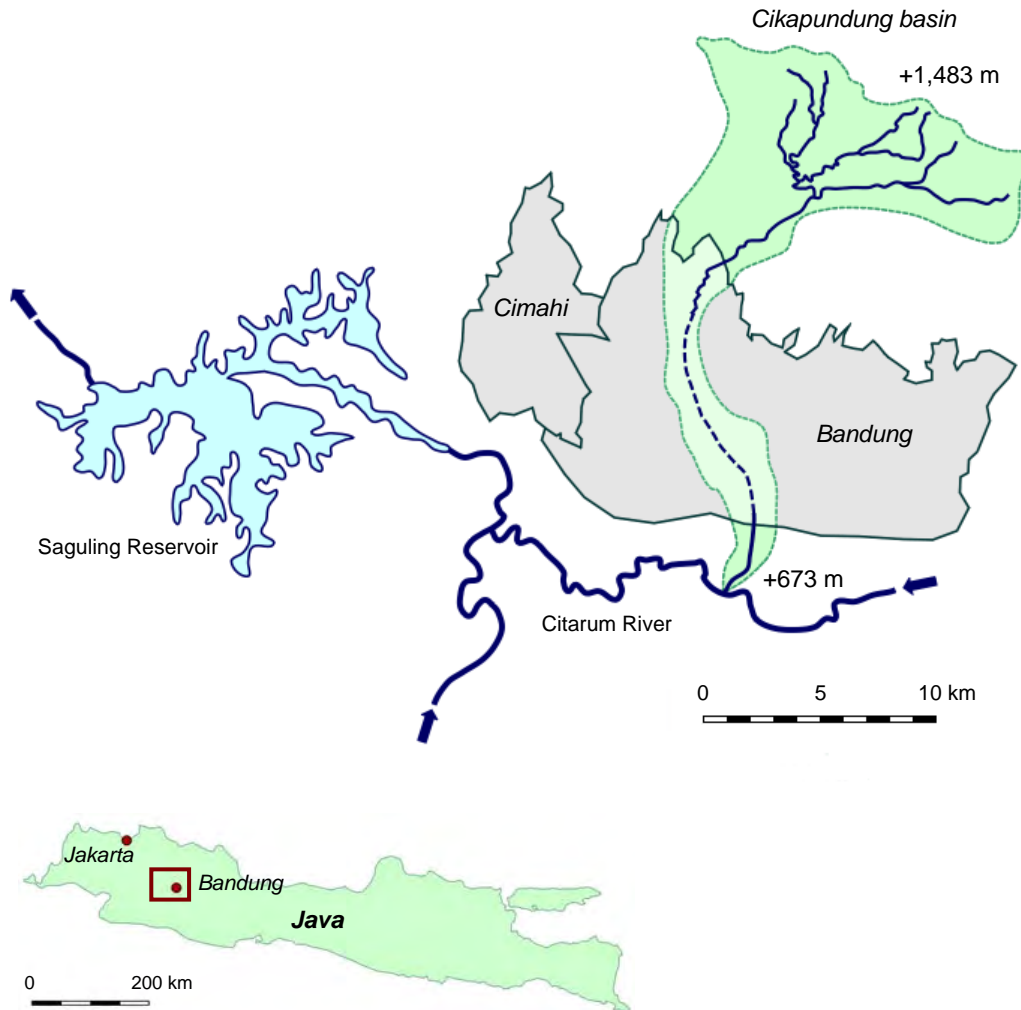
References and literature

- Antara News Jawa Barat (Oct 10): Revitalisasi Cikapundung Segera Disusul Pembangunan “Septic Tank” Komunal
- Both ENDS and Gomukh (2005): River basin management: A negotiated approach. Funded by the Directorate General for International Co-operation (DGIS, part of the Dutch Ministry of Foreign Affairs). Available at www.bothends.org
- Galamedia (Okt 10): Menata Rumah Hadap Sungai. Yeni S. Apriani. Harian Umum Galamedia. 19 Oktober 2010. www.klik-galamedia.com
- Gatra.com (Okt 10): Sepuluh Ribu Bibit Ikan Ditebar di Cikapundung. Gatra.com. Berita Kita Hari Ini
- Green and Tunstall (1992): The amenity and environmental value of river corridors in Britain (In Boon and others: River conservation and management. John Wiley and Sons)
- Hermawan, Pri and Kyoichi Kijima (Mar 09): Conflict analysis of Citarum River Basin pollution in Indonesia: A drama-theoretic model. *J Syst Sci Syst Eng* 18(1): 016-037
- Jun Oura (Aug 07): Interpretation of Indonesian political movement with drama theory. Proceedings of the 51st Annual Meeting of the International Society of the Systems Sciences. Tokyo Institute of Technology, Tokyo, Japan
- Mela Reika Indrasari and others (2010): Normalisasi Sungai Cikapundung. Perencanaan Komprehensif dengan Pendekatan Partisipatif yang Melibatkan Multi Stakeholder. Kelompok 4. AR 5241. Perencanaan di Negara Berkembang. www.scribd.com
- Menteri Pekerjaan Umum (Feb 93): Peraturan Menteri Pekerjaan Umum Nomor: 63/Prt/1993 tentang Garis Sempadan dan Sungai, Daerah Manfaat Sungai, Daerah Penguasaan Sungai, dan Bekas Sungai. Ditetapkan: Jakarta
- Newson, M.D. (1992): River conservation and catchment management: A UK perspective. (In Boon and others: River conservation and management. John Wiley and Sons)
- Pemerintah Provinsi Jawa Barat (2006): Peraturan Daerah Provinsi Jawa Barat Nomor 2 Tahun 2006 Tentang Pengelolaan Kawasan Lindung. Nomor 1 Seri E
- Pemerintah Kota Bandung (2008): Peraturan Daerah Kota Bandung Nomor 08 Tahun 2008 tentang Rencana Pembangunan Jangka Panjang Daerah (RPJPD) Tahun 2005-2025. Lembaran Daerah Kota Bandung Tahun 2008 Nomor 08
- Pemerintah Kota Bandung. 2009. Peraturan Daerah Kota Bandung Nomor 09 Tahun 2009 tentang Rencana Pembangunan Jangka Menengah Daerah (RPJMD) Tahun 2009-2013. Lembaran Daerah Kota Bandung Tahun 2009 Nomor 09
- Pikiran Rakyat (Jan 10): Cikapundung Direvitalisasi. A-188. Dalam PT PSG. www.prajasuryaninggrha.com
- Pikiran Rakyat (Okt 10): Hulu Cikapundung Dibenahi, Menjadi Kawasan Wisata Air. *Pikiran Rakyat Online*
- Pojok Kang Dada (2009): Kendala Menata Cikapundung. If there's a will, there's a way. <http://pojok-kangdada.blogspot.com/2009/05/>
- Praja Suryaning Grha, PT (2010): The Cikapundung river revitalization master plan: Our River, Our Culture
- Praja Suryaning Grha, PT (2010): Tentang PSG. The Cikapundung Revitalization Project. www.prajasuryaninggrha.com
- Ryani Gunawan and others (2010): Pembangunan Kawasan Tepi Air Sungai Cikapundung. Dalam Upaya Peningkatan Kualitas Hidup Kaum Marginal di Sepanjang Sungai Cikapundung. Sekolah Arsitektur, Perencanaan, dan Pembangunan Kebijakan, Institut Teknologi Bandung. www.scribd.com
- Samaoen Bakry (1946): Peringatan Setahoen Peristiwa Bandoeng. Catatan Perang Kemerdekaan. Koleksi Perpustakaan Dinapasi Al Munawarah. Jalan Gamelan 5, Bandung 40264
- Seputar Indonesia. Bandung (Feb 10): Revitalisasi atau Komersialisasi. Rudini. Dalam PT PSG. www.prajasuryaninggrha.com
- Sri Handayani (2007): Transformasi Model Penanganan Kawasan Permukiman Kumuh: Upaya Perbaikan Kualitas Hidup dan Lingkungan (Kasus Permukiman Kumuh Sekitar Sungai Cikapundung, Daerah Babakan Siliwangi sampai Jembatan Tamansari). Program Studi Pendidikan Arsitektur FPTK-UPI
- Supardiyono Sobirin (Nov 10): Kajian upaya sinergi berbasis teori drama membangun kenyamanan Sungai Cikapundung di Kota Bandung, Jawa Barat. National Seminar and Workshop of River Management in Indonesia, organized in Solo by CRBOM and Sungai Balai, Research Center for Water Resources
- Supardiyono Sobirin (2008): Kajian Lingkungan Hidup Strategis Kawasan Cekungan Bandung. Environmental Sector Program Pahse 2, DANIDA, Output 2.2 (SEA Applied in Policy Analysis and Environmental Planning). Pemerintah Denmark dan Kantor Menteri Negara Lingkungan Hidup
- Utomo Sarjono Putro (2006): The Six Dilemmas of Cooperation. School of Business and Management - Institut Teknologi Bandung, SBM-ITB. Teaching material for drama theory

Appendix A: The Cikapundung River Basin

Cikapundung River has its source at Bukit Tunggul north of Bandung, West Java. With a length of 28 km, it intercepts Bandung from north to south before discharging into Citarum River just south of Bandung. Its basin has an area of 154 km² (15,400 ha) and is home to some 750,000 people (or some 150,000 households), with an average population density of around 122 persons/ha. In the Tamansari area in Central Bandung, the density is 282 persons/ha.

Figure 3: Location map



The flow has a pronounced seasonality, with extremely low flow in the dry season, whereas in the wet season, the river overtops its banks, causing floods.

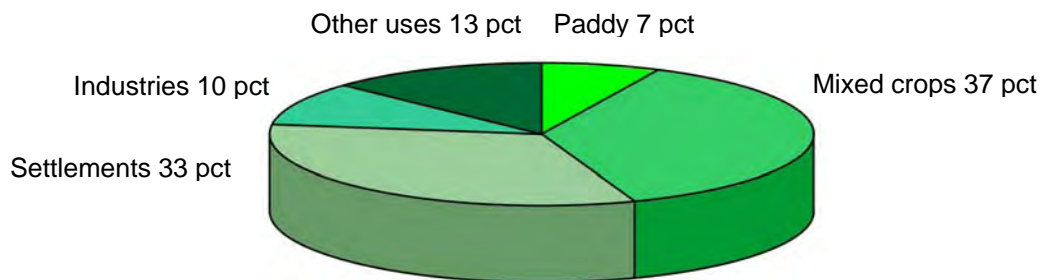
A massive flood occurred on 24 November, 1945, during the period of struggle for independence. The death toll was high and many houses were damaged by a flash flood of almost three metres. This flood inundated the central part of Bandung city and mud covered main roads in the area. The cause of the flood was unclear; some said that it was simply due to

heavy rainfall in the upstream parts, but others said that a landslide had blocked the waterway and then collapsed.²

On its way through Bandung, the river has been narrowed from an original width of 25-30 m to 10-20 m today, due to dense squatter settlements. The upper parts of the basin are affected by deforestation.

Land use in the basin is summarised in the figure below.

Figure 4: Land use



Heavy pollution is caused by sewage and garbage disposal, as it is frequently seen for rivers flowing through cities in Indonesia. The table below illustrates the quality declines from upstream to downstream.

Table 3: Quality of the Cikapundung River

	Upper reach	Middle reach	Lower reach	Target 1)
BOD	4 mg/l	10 mg/l	14 mg/l	2 mg/l
COD	10 mg/l	22 mg/l	24 mg/l	10 mg/l
DO	7 mg/l	3 mg/l	1 mg/l	6 mg/l
Detergent	0.24 mg/l	0.30 mg/l	0.36 mg/l	0.20 mg/l
Fecal Colliform	36/100 ml	105/100 ml	140/100 ml	0/100ml

Data: 2004, Indah Karya dan Larona

1) Government Regulation No. 82 ,2001 on Water Quality Management and Water Pollution Control

Restoration of the Cikapundung River is included in the planning of the local government through its programme *Gerakan Cikapundung Bersih/ Clean Cikapundung Movement*.

² Samaoen Bakry (1946)

**Center for River Basin Organizations and Management,
Solo, Central Java, Indonesia
www.crbom.org, info@crbom.org**